NOVEMBER/DECEMBER 2024

# 23UCA31 — DATA STRUCTURE AND ALGORITHMS

Time : Three hours Maximum : 75 marks

SHANMUGA INDUSTRIES ARTS & SCIENCE COLLEGE LIBRARY

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define: Data Structure.
2. Difference between Arrays and Lists.
3. Convert the infix (a+b)*(c+d)/f into postfix expressions.
4. How do you test for an empty queue?
5. What is the maximum number of nodes at level five of a binary tree?
6. What is a Threaded Binary Tree?
7. Distinguish between Cycles and Loops.
8. State any two applications of Graph.
9. Define Sorting.
10. What is Collision in hashing?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Write the routine for insertion operation of singly linked list.

Or

(b) Narrate the four basic Operations performed on doubly linked lists.

12. (a) Write an algorithm for Push and Pop operations on Stack.

Or

(b) Write an algorithm for converting infix expression to postfix expression.

13. (a) Draw the expression tree and find the infix and prefix expressions for the following postfix expression:

AB × CD/ + EF – ×

Or

(b) Discuss about the significances of B+ Tree.

14. (a) Illustrate the Breadth-First Tree Traversal technique.

Or

(b) Narrate the various types of Graphs.



15. (a) Illustrate the algorithm for Insertion Sort.

Or

(b) Briefly describe the concept of Open Addressing.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the operations of Circular Linked Lists.

17. Expound any two Operations on Queue.

18. Examine the several operations used on Binary Search Trees.

19. Design an Algorithm to perform Topological Sort. Give an example.

20. Write the procedure to perform searching operations using Linear Search.

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